UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

James A. K. Miyamoto, P.E.
Deputy Operations Officer
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
Joint Base Pearl Harbor Hickam, HI 96860

Re: Disapproval of Red Hill Administrative Order on Consent (AOC) Scope of Work (SOW) Deliverable under Sections 6 & 7 – Work Plan/ Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility, May 4, 2016

Dear Mr. Miyamoto:

The U.S. Environmental Protection Agency ("EPA") and Hawaii Department of Health ("DOH"), collectively the "Regulatory Agencies", have reviewed the *Work Plan/ Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility* ("Section 6 and 7 SOW") submitted by the U.S. Navy ("Navy") and Defense Logistics Agency ("DLA") on May 4, 2016. The Regulatory Agencies are disapproving the Section 6 and 7 SOW, pursuant to AOC Sections 7(b)(d). **The Navy is required to resubmit the Section 6 and 7 SOW with revisions within 30 days of their receipt of this letter as per AOC Section 7(b).**

The work being conducted under sections 6 and 7 is critical for bounding the risk to drinking water resources from potential future releases at the facility. To meet this objective, the Navy and DLA will need to gather sufficient data and conduct appropriate analysis of the data to establish likely groundwater flow direction that can be used to predict contaminant flow direction and rate. Achieving this objective in a way that obtains regulatory approval, and stakeholder acceptance to the maximum extent practicable, will enable this analysis to be used for assessing probability of impact to drinking water resources from potential future releases in a defensible manner.

The SOW does not adequately describe the work to be performed in order to meet the objectives of sections 6 and 7 of the AOC. The Agencies require that the Navy and DLA revise the SOW pursuant to the comments below. In addition, the Navy and DLA shall address the detailed comments included in attachment A (Regulatory Agencies Detailed Technical Comments and Observations) and attachment B (External Subject Matter Expert Comments).

Comments

1) **The conceptual model presented in the SOW is incomplete and does not adequately acknowledge uncertainty related to the conditions around the Red Hill Facility.** Instead of presenting an inadequate conceptual model in the workplan, the workplan should be revised to describe the process and approach to be used to create a defensible initial conceptual site model that acknowledges uncertainty and is based on all data available for the site. The initial conceptual site model plan should be submitted to the Agencies for approval prior to developing the site model.
2) **The conceptual model needs to evaluate NAPL movement in the saturated and unsaturated zones for the purposes of risk characterization.** The workplan for the conceptual model needs describe an approach for evaluating the potential migration rates and directions for NAPL movement from all areas of the facility in a conservative manner. Estimation of NAPL migration from potential releases evaluated as part of the Section 8 work is needed to characterize the consequences of potential future releases. In order to do this, the plan will need to describe how the lithology data will be used to estimate the probable NAPL migration direction, the fraction of NAPL that will become immobilized in the vadose zone, and the fraction of released NAPL that will reach the water table either as LNAPL or dissolved phase contamination. The SOW should further provide a plan for assessing the migration of LNAPL on the water table.
3) **The SOW does not adequately describe the existing data available that can be used for the modeling effort and assessment of adequacy of data to achieve objectives of the AOC.** The Navy and DLA should compile all existing data, including but not limited to groundwater chemistry data, water table elevation data, precipitation data, groundwater production data, aquifer test data, boring logs, tank barrel logs, and other relevant data into a standalone deliverable. This document should not only present the data, but assess the quality and limitations of the data for the purposes of satisfying the objectives of the AOC.
3)4) **The SOW does not describe how groundwater flow paths will be determined since groundwater gradients and groundwater flow direction are not always coincident.** Anisotropy, formation heterogeneity, and subsurface structures can result in groundwater flow paths not adequately characterized by groundwater gradient. The SOW needs to specify how the presence of subsurface structures will be evaluated and their impact on groundwater flow patterns assessed.
4)5) **The SOW does not adequately describe the work to be performed to update the model, recalibrate the model, assess model sensitivity, and then utilize the model as an assessment tool to inform AOC decisions.** The workplan should be revised so that the model refinement effort is transparent and provides appropriate opportunity for Regulatory Agency and SME involvement. During this effort, the agencies expect that numerous professional judgement decisions will be necessary to recalibrate the model in order to fit the model to all of the available data. The workplan should describe how these professional judgement decisions and other assumptions will be made and documented as part of the model improvement. Given the importance of the model in future AOC related decisions, the modeling effort should strive to utilize a team approach that involves individuals with demonstrated expertise and experience. The desired expertise is describe further in the attached Regulatory Agency Detailed Technical Comments - Attachment A.
5)6) **The SOW does not adequately describe how the assessment of attenuation rate of fuel in the vadose zone and saturated zone will be evaluated as part of this effort.** The Navy and DLA should present a plan for collecting and analyzing data to evaluate and bound the likely

rate of fuel attenuation in the subsurface from the potential range of releases that could occur at Red Hill. Understanding the likely range of attenuation rates is important for both the development of the conceptual site model and for the fate and transport modeling effort. Attenuation of hydrocarbon is likely to be a very important mechanism to adequately understand in order to accurately characterize the consequences of releases from the facility.

7) **The workplan does not adequately describe how an adequate sentinel monitoring well network will be established for early detection of contaminants from the Red Hill Facility that could approach the groundwater production facilities.** The Navy and DLA shall present a plan for evaluating and establishing an sentinel network for the existing groundwater production points that will provide sufficient certainty that any contaminants approaching these production points can be detected adequately and in a timely manner that will allow for execution of contingency measures in a manner that will prevent contaminated groundwater from entering the drinking water distribution networks.

Formatted: Font: Bold

6)8) **The workplan does not describe how the results of the groundwater investigation and resulting modeling will be used to establish risk based decision criteria.** The Navy and DLA shall present a plan to integrate the risk assessment of Section 8 with the data collected and models generated by Section 7 to establish risk based criteria for the Groundwater Protection Plan and any emergency response plans that are developed to mitigate or prevent fouling of groundwater resources by fugitive fuel.

7)9) **The workplan does not present an adequate process for assessing the quality, sensitivities, and potential uncertainties of the current groundwater model that the Navy and DLA proposed to update to meet the objectives of the AOC.** The Navy and DLA shall submit a groundwater model evaluation plan that describes a process for critical review of the existing groundwater model in a manner that identifies uncertainties and describes options for reducing uncertainty. This evaluation should include evaluation of the need for additional aquifer tests to further reduce uncertainty. The report should also analyze how the most recently collected data fits the previously calibrated model.

8)10) **The SOW does not adequately describe content and organization of deliverables, project schedule, and opportunities for Regulatory Agencies and External Subject Matter Expert review of assumptions and information to be used to develop deliverables.** The Navy and DLA shall provide an outline of deliverables to be produced as part of this effort including outline of groundwater monitoring reports, investigation reports, modeling reports, and other relevant reports. This outline of deliverables shall identify the tables, graphs, charts, and figures proposed for these deliverables. The Navy and DLA shall also provide a project schedule describing the work to be performed under sections 6 and 7 including schedule for activities including, but not limited to data collection events, interim deliverables, final deliverables, comment periods, and decision meetings. In developing this schedule, the Navy and DLA shall reduce the duration of time between sample collection and data reporting to the Regulatory Agencies to the maximum extent practical.

In summary, and in order to expedite the work to be performed, we strongly suggest that this SOW be simplified and focus on the work to be performed and reserve the presentation of historic background data and other information to the individual deliverables outlined in the revised SOW.

We are available to discuss our comments in more detail. Please contact us with any questions. Bob Pallarino can be reached at (415) 947-4128 or at [HYPERLINK "mailto:pallarino.bob@epa.gov"] and Steven Chang can be reached at (808) 586-4226 or at [HYPERLINK "mailto:steven.chang@doh.hawaii.gov"].

Sincerely,

Bob Pallarino
EPA Red Hill Project Coordinator

Steven Chang, P.E.
DOH Red Hill Project Coordinator

Enclosures

cc: Captain R. D. Hayes
Mr. Stephen Turnbull, U.S. Navy